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TRANSACTIONS  
OF THE  
KANSAS  
ACADEMY OF SCIENCE.

VOL. XXI, PART I.

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CONTAINS  
LIST OF OFFICERS, PAST AND PRESENT; MEMBERSHIP LIST  
JANUARY 1, 1908; SKETCH OF THE ACADEMY; CONSTI-  
TUTION AND BY-LAWS; MINUTES OF FORTIETH  
ANNUAL MEETING; PRESIDENT'S ADDRESS,  
AND SOME PAPERS READ.

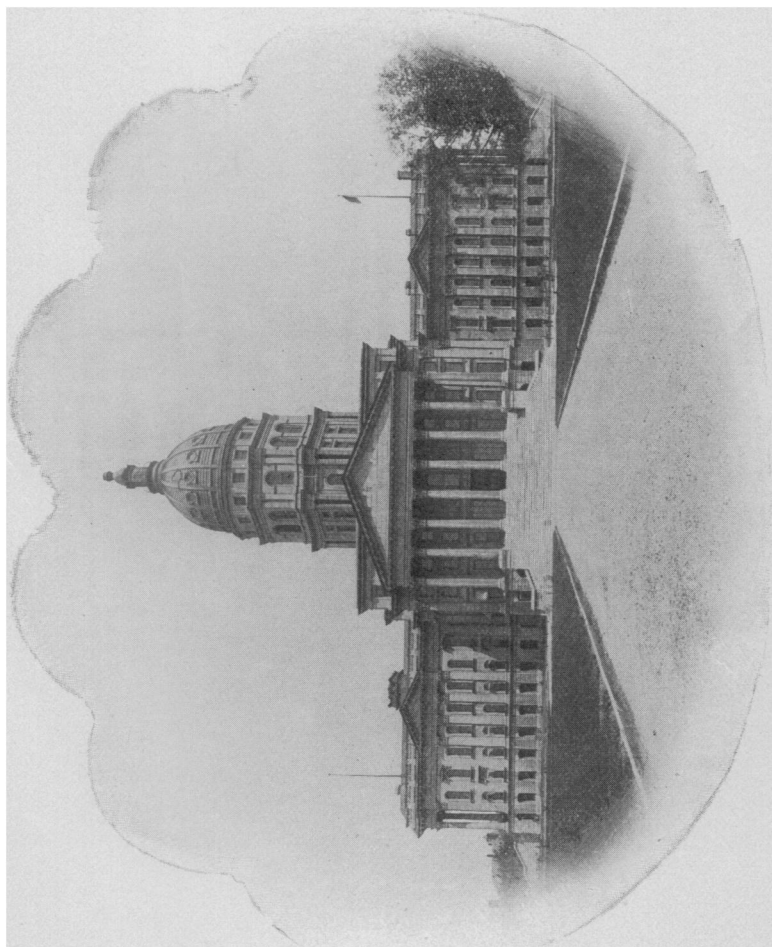
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*December, 1907.*

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STATE PRINTING OFFICE,  
TOPEKA, 1908.



**STATE CAPITOL BUILDING.**  
Containing rooms of the Kansas Academy of Science.

TRANSACTIONS  
OF THE  
KANSAS  
ACADEMY OF SCIENCE.

VOL. XXI, PART I.

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AND SOME PAPERS READ.

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*December, 1907.*

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STATE PRINTING OFFICE,  
TOPEKA, 1908.

## OFFICERS OF THE ACADEMY, 1908.

|                             |                      |           |
|-----------------------------|----------------------|-----------|
| <i>President</i> .....      | E. HAWORTH .....     | Lawrence. |
| <i>Vice-president</i> ..... | F. B. DAINS .....    | Topeka.   |
| <i>Vice-president</i> ..... | J. M. MCWHARF .....  | Ottawa.   |
| <i>Treasurer</i> .....      | ALVA J. SMITH .....  | Emporia.  |
| <i>Secretary</i> .....      | J. T. LOVEWELL ..... | Topeka.   |

### Past Presidents of the Academy.

|               |                     |           |                  |
|---------------|---------------------|-----------|------------------|
| 1869,'70..... | B. F. Mudge.        | 1894..... | L. E. Sayre.     |
| 1871-'73..... | John Fraser.        | 1895..... | Warren Knaus.    |
| 1874-'78..... | F. H. Snow.         | 1896..... | D. S. Kelly.     |
| 1879,'80..... | B. F. Mudge.        | 1897..... | S. W. Williston. |
| 1881,'82..... | J. T. Lovewell.     | 1898..... | D. E. Lantz.     |
| 1883.....     | A. H. Thompson.     | 1899..... | E. B. Knerr.     |
| 1884,'85..... | R. J. Brown.        | 1900..... | A. S. Hitchcock. |
| 1886.....     | E. L. Nichols.      | 1901..... | E. Miller.       |
| 1887.....     | J. D. Parker.       | 1902..... | J. T. Willard.   |
| 1888.....     | J. R. Mead.         | 1903..... | J. C. Cooper.    |
| 1899.....     | T. H. Dinsmore, jr. | 1904..... | Edward Bartow.   |
| 1890.....     | G. H. Failyer.      | 1905..... | L. C. Wooster.   |
| 1891.....     | Robert Hay.         | 1906..... | F. O. Marvin.    |
| 1892.....     | E. A. Popenoe.      | 1907..... | J. A. Yates.     |
| 1893.....     | E. H. S. Bailey.    |           |                  |

### PAST VICE-PRESIDENTS.

|               |  |           |   |
|---------------|--|-----------|---|
| 1869,'70..... | J. S. Whitman.                             | 1892..... | F. O. Marvin and<br>Mrs. N. S. Kedzie.  |
| 1871.....     | B. F. Mudge.                               | 1893..... | J. T. Willard and<br>E. B. Knerr.       |
| 1872,'73..... | B. F. Mudge and<br>Dr. R. J. Brown.        | 1894..... | I. D. Graham and<br>J. D. Hewitt.       |
| 1874.....     | J. A. Banfield and<br>J. D. Parker.        | 1895..... | I. D. Graham and<br>S. W. Williston.    |
| 1875.....     | B. F. Mudge and<br>J. D. Parker.           | 1896..... | S. W. Williston and<br>D. E. Lantz.     |
| 1876,'77..... | B. F. Mudge.                               | 1897..... | D. E. Lantz and<br>A. S. Hitchcock.     |
| 1878.....     | B. F. Mudge and<br>J. H. Carruth.          | 1898..... | C. S. Parmenter and<br>L. C. Wooster.   |
| 1879-'82..... | J. H. Carruth and<br>Joseph Savage.        | 1899..... | A. S. Hitchcock and<br>J. R. Mead.      |
| 1883.....     | J. R. Mead and<br>G. E. Patrick.           | 1900..... | E. Miller and<br>J. C. Cooper.          |
| 1884.....     | F. H. Snow and<br>Joseph Savage.           | 1901..... | J. C. Cooper and<br>L. C. Wooster.      |
| 1885.....     | E. L. Nichols and<br>G. H. Failyer.        | 1902..... | Edward Bartow and<br>J. A. Yates.       |
| 1886.....     | J. D. Parker and<br>N. S. Goss.            | 1903..... | Edward Bartow and<br>J. A. Yates.       |
| 1887.....     | J. R. Mead and<br>E. H. S. Bailey.         | 1904..... | L. C. Wooster and<br>B. F. Eyer.        |
| 1888.....     | E. H. S. Bailey and<br>T. H. Dinsmore, jr. | 1905..... | F. W. Bushong and<br>W. A. Harshbarger. |
| 1889.....     | E. H. S. Bailey and<br>G. H. Failyer.      | 1906..... | B. F. Eyer and<br>J. E. Welin.          |
| 1890.....     | D. S. Kelly and<br>F. W. Cragin.           | 1907..... | E. Haworth and<br>F. B. Dains.          |
| 1891.....     | F. W. Cragin and<br>O. C. Charlton.        |           |   |

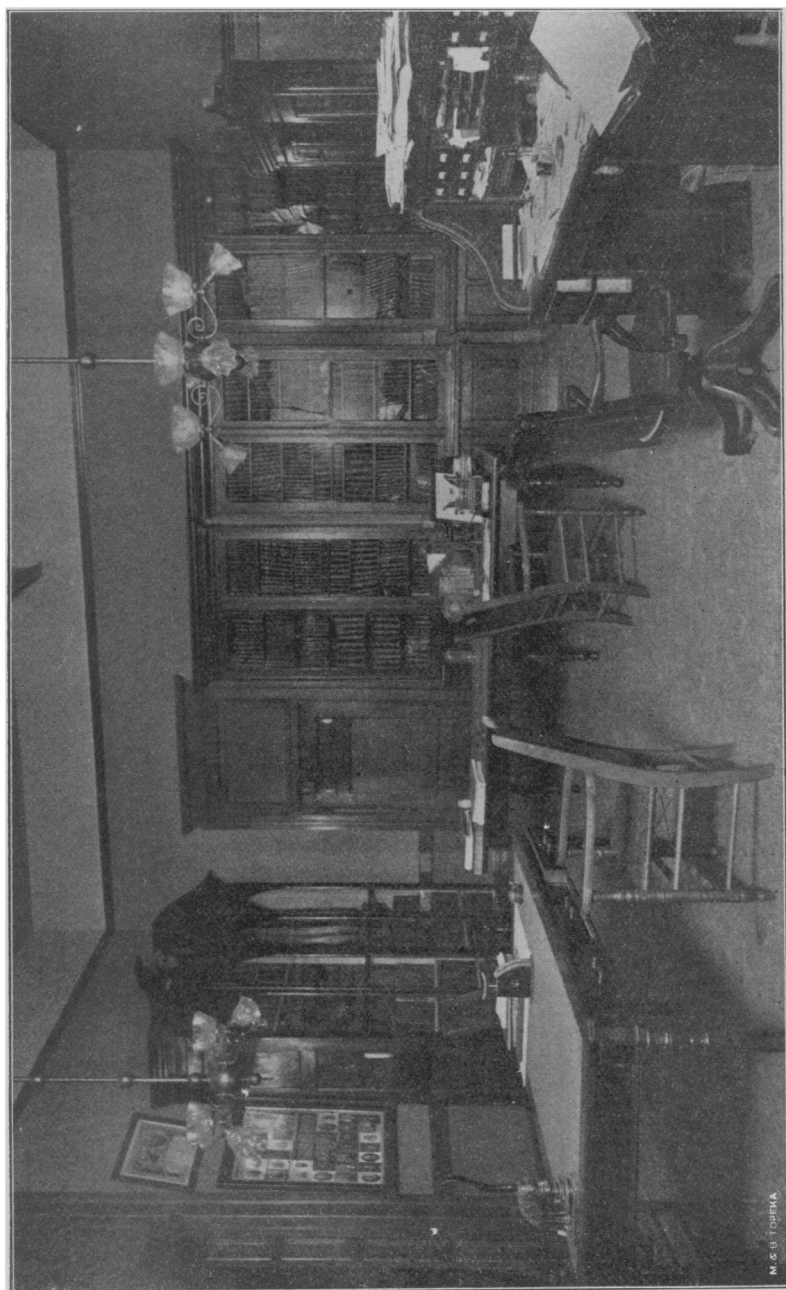
## Past Officers of the Academy—Concluded.

### SECRETARIES.

|               |                  |               |                 |
|---------------|------------------|---------------|-----------------|
| 1869-'73..... | J. D. Parker.    | 1893.....     | A. M. Collette. |
| 1874,'75..... | John Wherrell.   | 1894-'98..... | E. B. Knerr.    |
| 1876,'77..... | Joseph Savage.   | 1899-1901.... | D. E. Lantz.    |
| 1878-'89..... | E. A. Popenoe.   | 1902-'04..... | G. P. Grimsley. |
| 1890-'92..... | E. H. S. Bailey. | 1905-'07..... | J. T. Lovewell. |

### TREASURERS.

|               |                 |               |                 |
|---------------|-----------------|---------------|-----------------|
| 1869-'73..... | F. H. Snow.     | 1891.....     | F. O. Marvin.   |
| 1873-'75..... | R. J. Brown.    | 1892-'95..... | D. S. Kelly.    |
| 1876,'77..... | W. K. Kedzie.   | 1896.....     | L. E. Sayre.    |
| 1878-'83..... | R. J. Brown.    | 1897-1900.... | J. W. Beede.    |
| 1884,'85..... | A. H. Thompson. | 1901,'02..... | E. C. Franklin. |
| 1886-'90..... | I. D. Graham.   | 1903-'07..... | Alva J. Smith.  |



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## MEMBERSHIP OF THE ACADEMY,

January 1, 1908.

Dates in the following list signify date of election to membership in the Academy.

---

### HONORARY MEMBERS.

G. P. Grimsley, Ph. D., 1904, asst. state geologist, Morgantown, W. Va.  
Rev. Johns D. Parker, Ph. D., 1897, New Haven, Conn.  
Arnold G. Johnson, 1897, U. S. Lighthouse Board, Washington, D. C.  
W. A. Kellerman, Ph. D., 1897, Ohio State Univ., Columbus, Ohio.  
Edw. L. Nichols, Ph. D., 1897, Cornell Univ., Ithaca, N. Y.  
W. S. Franklin, Sc. D., 1897, Lehigh Univ., South Bethlehem, Pa.  
Geo. Wagner, Ph. D., 1904, Univ. of Wisconsin, Madison, Wis.  
S. W. Williston, Ph. D., 1902, Univ. of Chicago, Chicago, Ill.

### ASSOCIATE MEMBERS.

Mrs. R. J. Brown, 1903, Leavenworth.  
Mrs. Mary Savage, 1897, Lawrence.

### LIFE MEMBERS.

E. H. S. Bailey, Ph. D., 1883, Univ. of Kansas, Lawrence.  
J. C. Cooper, 1877, mineralogist, Topeka.  
F. W. Cragin, Ph. D., 1880, Colorado Springs.  
L. L. Dyche, M. S., 1881, Univ. of Kansas, Lawrence.  
Geo. H. Failyer, Ph. D., 1879, Dept. of Agr., Washington, D. C.  
E. C. Franklin, Ph. D., 1884, Stanford Univ., Stanford Univ., Cal.  
I. D. Graham, 1879, with *Kansas Farmer*, Topeka.  
Erasmus Haworth, Ph. D., 1882, Univ. of Kansas, Lawrence.  
Warren Knaus, M. S., 1884, editor, McPherson.  
D. E. Lantz, M. S., 1887, Biological Surv., Washington, D. C.  
J. T. Lovewell, Ph. D., 1878, chemist, Topeka.  
F. O. Marvin, C. E., 1884, Univ. of Kansas, Lawrence.  
J. R. Mead, 1879, Wichita.  
Ephraim Miller, Ph. D., 1873, Univ. of Kansas, Lawrence.  
E. A. Popenoe, A. M., 1872, Kansas Agr. Coll., Manhattan.  
L. E. Sayre, Ph. M., 1885, Univ. of Kansas, Lawrence.  
Alva J. Smith, 1903, county surveyor, Emporia.  
B. B. Smyth, 1880, curator Goss ornith. coll., Topeka.  
F. H. Snow, Ph. D., 1868, Univ. of Kansas, Lawrence.  
C. H. Sternberg, 1896, explorer and collector, Lawrence.  
A. H. Thompson, D. D. S., 1873, Topeka.  
M. L. Ward, D. D., 1880, Ottawa Univ., Ottawa.  
J. T. Willard, M. S., 1883, Kansas Agr. Coll., Manhattan.  
S. W. Williston, Ph. D., 1880, Univ. of Chicago, Chicago, Ill.

## ANNUAL MEMBERS.

- L. O. Adams, 1903, Univ. of Kansas, Lawrence.  
Orr Adams, 1898, Telluride, Colo.  
Frank G. Agrelius, 1905, Lawrence.  
Wm. Aitkinhead, 1906, Washburn Coll., Topeka.  
H. C. Allen, 1904, McPherson.  
Carroll D. Armstrong, M. D., 1905, Salina.  
John J. Arthur, 1904, Topeka.  
C. H. Ashton, 1903, Univ. of Kansas, Lawrence.  
W. M. Bailey, 1906, teacher, Holton.  
Harvey W. Baker, 1902, Kansas Agr. Coll., Manhattan.  
Elam Bartholemew, M. S., 1905, Stockton.  
Edward Bartow, Ph. D., 1897, State Water Surv., Urbana, Ill.  
W. J. Baumgartner, M. D., 1904, Univ. of Kansas, Lawrence.  
Frank G. Bedell, 1904, Iola.  
J. W. Beede, Ph. D., 1894, Univ. of Indiana, Bloomington, Ind.  
Julius Brandt, 1907, student, Lindsborg.  
H. H. Braucher, 1907, teacher, Emporia.  
F. W. Bushong, B. S., 1896, Univ. of Kansas, Lawrence.  
H. P. Cady, 1904, Univ. of Kansas, Lawrence.  
M. E. Canty, 1903, Buffalo.  
Charles I. Corp, 1905, Univ. of Kansas, Lawrence.  
Ewing N. Collett, 1903, Indian Univ., Bacone, I. T.  
Rev. John T. Copley, 1903, Clinton.  
R. W. Coppedge, 1905, teacher high school, Topeka.  
E. G. Corwine, 1905, Mulvane.  
Ralph K. Crawford, 1904, Univ. of Kansas, Lawrence.  
F. F. Crevecoeur, 1899, Onaga.  
F. B. Dains, Ph. D., 1902, Washburn Coll., Topeka.  
Emil O. Deere, A. M., 1905, Bethany Coll., Lindsborg.  
James Dickson, 1904, Univ. of Kansas, Lawrence.  
Robert K. Duncan, 1906, Univ. of Kansas, Lawrence.  
R. B. Dunlevy, B. S., 1896, Southwest Kan. Coll., Winfield.  
E. X. H. Dunmire, 1905, Univ. of Kansas, Lawrence.  
H. W. Emerson, 1904, Univ. of Kansas, Lawrence.  
B. F. Eyer, B. S., 1894, Kansas Agr. Coll., Manhattan.  
T. L. Eyerly, 1906, Canadian, Tex.  
W. F. Faragher, 1904, Univ. of Kansas, Lawrence.  
Thomas B. Ford, 1905, Univ. of Kansas, Lawrence.  
Lillian E. Fowler, 1905, teacher high school, Ottawa.  
A. O. Garrett, 1901, teacher high school, Salt Lake City, Utah.  
Frank Gephart, 1906, medical school, Evanston, Ill.  
R. W. Gragg, 1907, laundry, Bartlesville, I. T.  
O. S. Groner, 1907, Ottawa Univ., Ottawa.  
Brice E. Hammers, 1904, chemist, Topeka.  
Dr. Eva Harding, 1904, Topeka.  
H. J. Harnly, B. S., 1903, McPherson Coll., McPherson.  
W. A. Harshbarger, B. S., 1900, Washburn Coll., Topeka.  
Frank Hartman, 1905, high school, Wichita.  
L. D. Havenhill, 1904, Univ. of Kansas, Lawrence.

- T. J. Headlee, 1907, professor of entomology, Manhattan.  
 Dr. Francis C. Herr, 1905, Ottawa.  
 W. C. Hoad, 1904, Univ. of Kansas, Lawrence.  
 Gertrude E. Hole, 1906, Manhattan.  
 H. A. Horton, 1906, McPherson.  
 W. F. Hoyt, A. M., 1902, Wesleyan Univ., Salina.  
 L. C. Hodson, 1905, Univ. of Kansas, Lawrence.  
 B. C. Hubbell, 1905, Concordia.  
 Albert K. Hubbard, 1904, Univ. of Kansas, Lawrence.  
 Thomas M. Iden, 1897, State Norm. Sch., Emporia.  
 John J. Jewett, 1902, Sawtelle, Cal.  
 A. W. Jones, B. S., 1894, Wesleyan Univ., Salina.  
 George F. Kay, 1904, Univ. of Kansas, Lawrence.  
 W. H. Keller, 1898, teacher high school, Effingham.  
 Leslie A. Kenoyer, 1906, Independence.  
 Harry L. Kent, 1904, State Norm. Sch., Hays.  
 John H. Klopfer, 1904, Topeka.  
 Pierce Larkin, 1902, high school, Helena, Okla.  
 M. A. Low, 1906, attorney, Topeka.  
 L. A. Lowther, 1907, superintendent of schools, Emporia.  
 F. A. Marlatt, 1907, machinist, Agr. Coll., Manhattan.  
 R. Matthews, D. D. S., 1898, Wichita.  
 D. F. McFarland, 1903, Univ. of Kansas, Lawrence.  
 J. M. McWharf, M. D., 1902, Ottawa.  
 Grace R. Meeker, 1899, Ottawa.  
 C. F. Menninger, M. D., 1903, Topeka.  
 H. L. Miller, 1904, high school, Topeka.  
 W. L. Moodie, 1906, Univ. of Kansas, Lawrence.  
 Travis Morse, 1903, Iola.  
 H. N. Moses, M. D., 1907, Salina.  
 C. A. Nash, 1907, teacher, Emporia.  
 J. H. Newby, 1899, Osage City.  
 N. P. Nielsen, 1906, architect, Topeka.  
 A. M. Nissen, A. M., 1888, teacher high school, Wetmore.  
 Henry N. Olson, 1905, Bethany Coll., Lindsborg.  
 Frank Patrick, 1903, Topeka.  
 Leslie F. Paull, 1903, manual tr. sch., Kansas City, Mo.  
 L. M. Peace, 1904, Univ. of Kansas, Lawrence.  
 Arthur D. Pitcher, 1906, Univ. of Kansas, Lawrence.  
 Norman Plass, D. D., 1902, president Washburn Coll., Topeka.  
 M. A. Pond, 1906, teacher, Topeka.  
 L. M. Powell, M. D., 1906, Topeka.  
 Charles H. Popenoe, 1903, Washington, D. C.  
 C. S. Prosser, M. S., 1892, Ohio State Univ., Columbus, Ohio.  
 W. S. Prout, 1904, Columbia University, N. Y.  
 Albert B. Reagan, 1904, Indian School, Mora, Wash.  
 W. B. Robertson, 1905, Univ. of Kansas, Lawrence.  
 B. R. Rogers, D. V., 1907, Agr. Coll., Manhattan.  
 W. G. Russell, 1905, Russell.  
 D. C. Schaffner, 1903, Coll. of Emporia, Emporia.

- J. H. Schaffner, A. M., M. S., 1902, Univ. of Ohio, Columbus, Ohio.  
Theo. H. Scheffer, 1903, Emporia.  
Eva Schley, 1903, teacher high school, Topeka.  
C. H. Shattuck, 1899, Washburn Coll., Topeka.  
Roscoe H. Shaw, 1904, Univ. of Missouri, Columbia, Mo.  
Miriam Sheldon, 1906, University of Chicago, Ill.  
E. T. Shelley, M. D., 1902, Atchison.  
Claude J. Shirk, 1905, McPherson Coll., McPherson.  
J. A. G. Shirk, 1904, Ottawa Univ., Ottawa.  
J. O. Short, 1907, electrician, Salina.  
Paul L. Shuey, 1905, Univ. of Kansas, Lawrence.  
Ralph C. Shuey, 1905, Univ. of Kansas, Lawrence.  
Eugene G. Smyth, 1901, Topeka, Kan.  
W. N. Speckman, Ph. D., 1903, Wesleyan Univ., Salina.  
William O. Starin, 1906, Univ. of Kansas, Lawrence.  
B. T. Stauber, D. D., 1903, Salina.  
S. G. Stewart, M. D., 1904, Topeka.  
Chas. M. Sterling, 1904, Univ. of Kansas, Lawrence.  
E. F. Stimpson, 1904, Univ. of Kansas, Lawrence.  
Edgar Thomas, 1907, State Normal, Emporia.  
F. J. Titt, B. S., 1898, Kingfisher Coll., Kingfisher, Okla.  
J. E. Todd, 1907, geologist, Univ. of Kansas, Lawrence.  
David Train, 1907, student, Lindsborg.  
E. S. Tucker, 1904, Dept. Agr. Asst., Dallas, Tex.  
W. A. Van Varis, 1907, State Normal, Emporia.  
J. D. Walters, M. S., 1894, Kansas Agr. Coll., Manhattan.  
C. D. Weaver, M. D., 1902, McPherson.  
Ella Weeks, 1903, Kansas Agr. Coll., Manhattan.  
J. E. Welin, 1899, Bethany Coll., Lindsborg.  
Archie J. Werth, 1906, Univ. of Kansas, Lawrence.  
C. H. Withington, 1903, Kansas Agr. Coll., Manhattan.  
H. I. Woods, M. S., 1902, Washburn Coll., Topeka.  
L. C. Wooster, Ph. D., 1897, State Norm. Sch., Emporia.  
J. A. Yates, M. S., 1897, Ottawa Univ., Ottawa.  
Total number of members, January 1, 1908, 167.

ADDRESSES DELIVERED  
AND PAPERS READ  
BEFORE THE  
KANSAS ACADEMY OF SCIENCE,  
AT  
EMPORIA, 1907.

---

- I.—PRESIDENTIAL ADDRESS.
- II.—CHEMICAL AND PHYSICAL PAPERS.
- III.—GEOLOGICAL PAPERS.
- IV.—BIOLOGICAL PAPERS.
- V.—MISCELLANEOUS PAPERS.
- VI.—NECROLOGY.
- VII.—ANNOUNCEMENTS AND INDEX.

I.

PRESIDENT'S ADDRESS.

---

**"THE VALUE OF THE WORK OF THE SCIENTIST TO HUMANITY."**  
By JAMES A. YATES, Normal Training School, Pittsburg.

## II.

### CHEMICAL AND PHYSICAL PAPERS.

---

1. "GASTRIC FERMENTS."  
By C. F. MENNINGER, M. D., Topeka.
2. "ON THE REACTIONS OF FORMANIDINES."  
By F. B. DAINS, Ph. D., and E. W. BROWN, B. S., Washburn College.
3. "NATURAL GAS OBTAINED FROM TREES."  
By F. W. BUSHONG and D. F. MCFARLAND, University of Kansas, Lawrence.
4. "THE RELATION OF PUBLIC HEALTH TO THE QUALITY OF MEDICINE."  
By L. E. SAYRE, University of Kansas, Lawrence.
5. "PERCENTAGE OF EXTRACTIVES IN CERTAIN DRUGS AND SPICES."  
By L. E. SAYRE, University of Kansas, Lawrence.
6. "FIRELESS COOKING."  
By J. T. LOVEWELL, Ph. D., Topeka.
7. "ON THE PRESENCE OF NEON AND ARGON IN NATURAL GAS."  
By H. P. CADY and D. F. MCFARLAND, Lawrence.
8. "SANITARY WATER ANALYSIS."  
By E. H. S. BAILEY, University of Kansas, Lawrence.



### III.

## GEOLOGICAL PAPERS.

---

1. "NOMENCLATURE OF KANSAS COAL-MEASURES EMPLOYED BY THE KANSAS STATE GEOLOGICAL SURVEY."  
By ERASMUS HAWORTH and JOHN BENNETT, University of Kansas, Lawrence.
2. "SUMMARY OF GLACIAL LITERATURE RELATING TO GLACIAL DEPOSITS."  
By ALBERT B. REAGAN, La Push, Wash.
3. "ANIMALS, REPTILES AND AMPHIBIANS OF THE ROSEBUD INDIAN RESERVATION, SOUTH DAKOTA."  
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# IV.

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